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(54) Title of the Invention Semiconductor Wafer Polishing Device

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Specifications

1. Title of the invention Semiconductor Wafer Polishing Device

2. Claims

A semiconductor wafer polishing device comprised of a plate and a wafer holder equipped with a rotation means for holding the secured wafer on the plate surface, where the wafer holder can move freely in the X-direction and Y-direction on the surface of the plate.

3. Detailed Description of this Invention

[Industrial Field of Application]

This invention relates to a polishing device that polishes semiconductor wafers.

[Existing Art and Problems]

Currently, semiconductor wafers such as silicon wafers are subject to lapping, chemical etching and polishing with a polishing sheet and slurry for a mirror finish on the surface as pre-treatment for semiconductor production. The device that currently performs the mirror finishing involves a plate to secure the semiconductor wafer along with either a wafer holder containing a pressurized head that is affixed to the plate in a specific position or an arm connected to the holder that swings to the plate. The former rotates in a specific direction and the latter cannot move along tracks on the plate due to the specific length of the arm. With existing devices, the tracks on the plate are fixed and wafers slip easily, which makes it difficult to obtain a uniform polish and causes problems in selecting the appropriate track for conducting a uniform polish.

[Objective of this Invention]

This invention takes the existing problems into consideration and provides a polishing device capable of moving the wafer holder with the secured semiconductor wafer along tracks on the plate surface.

[Structure of this Invention]

To achieve the objectives given above, this invention is comprised of a plate and a wafer holder equipped with a rotation means for holding the secured wafer on the plate surface,

where the wafer holder can move freely in the X-direction and Y-direction on the surface of the plate via the motion means positioned at right angles.

[Operation]

With the structure given above, the wafer holder moves along the tracks on the plate according to the amount of motion set on the X-direction motion means and the Y-direction motion means position at right angles.

[Embodiment Examples]

Next is a description of the embodiment example for this invention, based on the figures. The plate 1 is round and flat and is affixed to the round and flat slurry plate 3 in concentric circles on the base 2. The semiconductor wafer ***a*** for polishing on the plate 1 is held flat on the wafer holder 4 on the plate 1 via an X-direction and Y-direction motion means 5. The wafer holder 4 does not have the currently standard structure because there is a plate where the semiconductor wafer ***a*** is secured. The plate is raised and lowered by an air cylinder 6 and is rotated by an AC servo motor 7.

The motion means 5 for the X/Y-direction motion for the wafer holder 4 on the plate 1 surface includes an X-direction motion means and a Y-direction motion means. The X-direction motion means is comprised of left/right guide rails 8, 8' holding the slurry tray 3 on the base 2; slide frames 9, 9' along the guide rails 8, 8'; X-axis ball screws 10 installed on the base parallel to one of the guide rails 8; and nuts 11 for the ball screws 10. These nuts 11 are attached to the slide frame 9. Also, the X-axis ball screws 10 are connected to the AC servo motor 12 via the coupling 13 and support unit 14 and can be rotated.

Guide rails 15, 15' are attached to the front and back of the Y-direction motion means 5_{-2} on the slide frames 9, 9' to the left/right of the X-direction motion means 5_{-1}. The wafer holder 4 slides along these front/back guide rails 15, 15'. The Y axis ball screws 16 along the left/right slide frames 9, 9' parallel to the guide rails 15, 15'. The nuts 17 for these Y axis ball screws 16 are attached to the wafer holder 4. Also, the Y axis ball screws 16 are connected to the same AC servo motor 12 as the X axis ball screws 10 via the coupling 19 and support unit 20 and can be rotated by operating the AC servo motor 18. In the figures, 21 is the operation controller, 22, 22' are the electric cord processing covers connected to the AC servo motor 12, 18 and can be adjusted according to the operation of the X-direction motion means 5_{-1} and the Y-direction motion means 5_{-2}.

With the structure given above, it is possible to input the amount of X and Y direction movement in advance with the operation controller. The wafer holder 4 moves on the plate 1 via operation of the X-direction motion means 5_{-1} and the Y-direction motion means 5_{-2} based on input data. Therefore, the wafer can be uniformly polished. There can be 8 types of tracks for the wafer holder 4 movement.

[Effect of this Invention]

As stated above, the polishing device in this invention is comprised of a plate and a wafer holder equipped with a rotation means for holding the secured wafer on the plate surface, where the wafer holder can move freely in the X-direction and Y-direction on the surface of the plate and the wafer holder can move along the plate so a uniformly polished wafer with a high degree of flatness can be obtained.

4. Brief Description of the Figures

The figures show the embodiment examples for this invention. Figure 1 is a top view and Figure 2 is a front view of one section.

In the figures,

1: plate
4: wafer holder
5: motion means
5_{-1}: X-direction motion means
5_{-2}: Y-direction motion means

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Figure 1

第 1 図

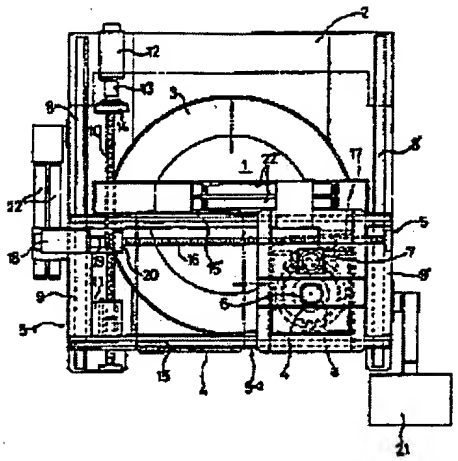

Figure 2

第 2 図

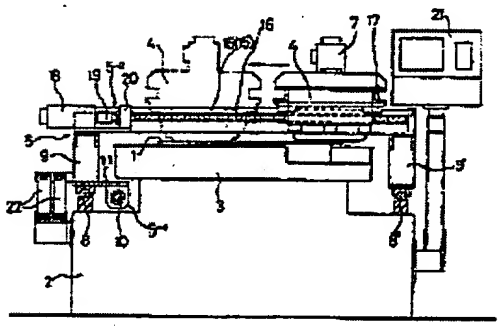

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Figure 3

第 3 図